REMARKS

The Office Action of April 29, 2005 has been carefully considered. Amendment of claims and reconsideration of this application in light of the following remarks is respectfully requested.

Claims 1-16 are pending in the application. Claims 1, 3, 4, 10, 12-13 and 15 have been amended. Claim 2 has been canceled, without prejudice. Claim 17 has been added by this amendment. No fee is due. Claims 3-4 have been amended to be dependent on claim 1, instead of claim 2.

The rejection of claims 10-12 as amended herein under 35 U.S.C. §112, second paragraph, as indefinite is hereby respectfully traversed.

The words "clock period" are now repeated in Claim 10, for the sake of clarity. The references to "clock" in claim 10 are changed to "clock signal" for the sake of clarity, and claim 1 has been amended to provide antecedent basis for this change in claim 10. This removes any inherited deficiency in claims 11 and 12. An obvious typographical error in claim 12 has also been corrected, so that claim 12 is now dependent on claim 11. This provides correct antecedent basis for the "said lower comparator threshold" recited in claim 12.

It should be noted that the realtime clock periods and said communications clock periods are at least "at first" equalized with respect to each other when the realtime clock periods are indirectly generated from said communications clock signal, as disclosed by applicants in paragraphs [0030] to

[0033], and "at first" has been changed to initially, for the sake of clarity.

Claim 17 has been added to set forth a preferred embodiment of the present invention. Support therefore can be found in paragraph **[0025]** and Fig. 1.

The rejection of Claims 1, 5-7, 9, and 13-14 and 16, as filed, under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 6,779,174 of Armhein et al. is hereby respectfully traversed.

In a communications system in accordance with applicants' invention, the realtime clock of the communications processor provides the time base for the control system, not some other clock or some other subassembly in the control system. A realtime communications clock that provides task switching in accordance with applicant's claimed invention, improves the control system's capacity for realtime process control in addition to supervising realtime communications within the control system, as pointed out in paragraph **[0010]** of the present application.

Also, in paragraph **[0004]** applicants disclose that their invention is directed to solving the problem of integrating wide-spread industrial control systems. Paragraph **[0028]** points out that the bus clock provided by a communications processor may become weak or even be lost in control systems that are connected across great distances. Paragraph **[0006]** points out that in these wide-spread industrial control systems the time base for overall process control should be the communications clock. In particular, paragraph **[0030]** and Figs. 3 and 4 of applicants' disclosure point out that the communications clock provided by the communications processor can, advantageously, be regenerated at distant points in the control system, to preserve the control system's time base.

Armhein et al. disclose a synchronous parallel processor that is adapted for controlling diverse types of operations on a respective running level of their stratified industrial control system. The frequency of the synchronous clock on each respective running level of the control processor is a multiple of the system time base and synchronous with it (column 1, lines 10-13). Armhein et al. assign respective different types of tasks to respective running levels, assigning realtime-mode tasks such as MC tasks, to one level, and non-realtime mode clocked tasks such as SPC tasks, to another, for example (col. 1, line 66 to col. 2, line 2). Armhein et al. assert that the independence produced by stratification of their control system processes is advantageous because it avoids communication between tasks (col. 2, lines 22-24), such as that occurring when switching tasks in German application DE 19 93 19 33.2.

The switching signal disclosed in German application DE 19 93 19 33.2, vaguely referred to by Armhein et al. as the "basic clock" therein, is the principal feature of DE 19 93 19 33.2 used by Armhein et al. to distinguish their control system from it: [this] basic clock is derived only from the clock of the communication medium and is only used for changing the operating system mode" (col. 1, lines 48-49), i.e., it 1) must be derived from the communications clock, 2) to be used as ar switching signal, unlike the time base used in their synchronous parallel processor.

The rejection of claims under 35 U.S.C. §102(e) in the present Office Action, on the other hand, relies upon the description of German application DE 19 93 19 33.2 provided by Armhein et al. for disclosure of several elements of claim 1: 1) a control system that has the realtime device control program (col. 1, line 42), 2) the clock-controlled switching signal (col. 1, lines 38-50), and 3) a realtime communications processor and "a cyclic communications clock that is independent of the control system" (col. 1, lines 39-40).

However, this rejection under 35 U.S.C. §102(e) also asserts that Armhein et al. disclose one of the elements of the rejected claims: a control system adapted for controlling at least one peripheral device (col. 1, lines 7-12), which is not part of the description of German application DE 19 93 19 33.2 provided by Armhein et al.

Thus the rejection of claims under 35 U.S.C. §102(e) in Office Action is asserting that applicants' claims read on a hybrid control system that combines the realtime device control program (col. 1, line 42) of DE 19 93 19 33.2 with the stratified synchronous control system of Armhein et al. that is referred to in lines 7-12 of column 1 and that time base in the parallel control processor of Armhein et al. (col. 2, lines 40-48), a realtime clock that is erroneously alleged to be applicants' "switching signal". Not only are these elements not combined by Armhein et al., as noted above, they cannot be combined with the control system of Armhein et al. because Armhein et al. distinguish their control system from them. It is also improper to combine any two references under 35 U.S.C. §102(e), regardless.

Various citations of the elements alleged to be disclosed by Armhein et al. are erroneous. Column 1, lines 7-12 of Armhein et al., does not disclose a "control system being adapted for controlling the operation of at least one peripheral device " is found there. On the contrary, these lines describe the unswitched controller Armhein et al. that has synchronous stratified running levels, but does not mention any peripheral device. In column 2 at lines 40-48, the alleged "switching signal pulses" are the time base to which the synchronous clocks on respective running levels are multiples of and synchronized with in the control processor of Armhein et al., which is not a "switched" control processor, as explained noted above. Lines 39-40 in column 1 of Armhein et al. do not disclose "a communications system having a realtime communications processor and a cyclic communications clock that is independent of the control system" is erroneous, because Armhein et al. do not disclose whether the communications clock of DE 19 93 19 33.2 is dependent or independent of its control system.

Applicants' Fig. 2 shows that their realtime clock signal T and the switching signal U that are generated from that time base T2, as disclosed in paragraph **[0026]** cannot both be synchronous with applicants' time base T2. Applicants at **[0026]** explain that these two signals are offset because, applicants are "changing the operating system mode" (col.1, lines 46-49) like the control system of DE 19 93 19 33.2. Thus the synchrony between running levels in the control system of Armhein et al. makes that control system inapposite both to applicant's control system and, in particular, to the switching signal recited in applicants' claims.

For example, the independent stratification of controlled processes in the control system of Armhein et al. permits their system time base to be derived from any convenient time base provided by components of the control system, even a peripheral attached to it or "a variable which belongs to the technological process" (col. 2, lines 46-49). The independence of the parallel processes operating on respective levels from those on other levels provided by their stratification permits this flexibility in the choice of a basic clock.

In contrast, the interdependence of applicants' switched processes makes applicants' claimed switching signal necessary, and makes applicants' generation of the signal that switches the control processor using the communications processor's clock, advantageous. (See paragraphs [0005] through [0007] of applicants' specification. Compare Armhein et al., col. 1, lines 28-37 and col. 2, lines 22-24 and 34-36.) Thus the independent parallel processor of Armhein et al. that minimizes communication between such tasks is inapposite to the interdependence of tasks in the switched control system claimed by applicants.

Thus, because Armhein et al. avoid the communication between different types of tasks that is disclosed in the two German applications they discuss by operating the different types tasks–SPC tasks and MC tasks for example–in parallel on respective running levels, instead of switching between them, an assertion that applicants' device is anticipated under 35 U.S.C. §102(e) by the innovative control system disclosed by Armhein et al. would be erroneous.

Because Armhein et al. point out that the basic clock disclosed in German application DE 19 93 19 33.2 "is only used for changing the operating system mode" of the control system (col. 1, lines 46-49), which teaches away from combining their control system with that of DE 19 93 19 33.2 such a combination of these control systems would also be improper.

With reference to the rejections of particular dependent claims under 35 U.S.C. §102(e), it is of course improper for these rejections of dependent claims to combine additional features of the controller disclosed by Armhein et al. with features of a different controller that is disclosed by the German application DE 19 93 19 33.2 under 35 U.S.C. §102(e), because Armhein et al. did not combined the features of these two different control systems.

Shifting of acyclic tasks to a communications processor, as recited in applicants' claim 2 relieves the control processor of acyclic computational burdens, and improves its performance of routine regulation and control functions, as pointed out in paragraph **[0011]** of the present application. However, the stratified, synchronous control processor of Armhein et al. runs processes in parallel rather interrupting realtime tasks to perform acyclic tasks. Also, the acyclic tasks in Armhein et al. are performed by their stratified, synchronous control processor, not a separate communications processor.

The assertion made with reference to applicants' claim 6 that "switching program operations is the purpose of the Armhein et al. patent" is without foundation because it contradicts their own description of the synchronous parallel processing provided by their stratified control processor. Again, they use that stratified synchronous multilevel control processor to avoid switching it between realtime (MC) and non-realtime (SPC) operation (col. 2 lines 22-24).

The assertion made with reference to applicants' claim 9 erroneously implies that Armhein et al. disclose a switch control processor.

The assertion made with reference to applicants' claim 14 and Fig. 3 of Armhein et al. is erroneous because Fig. 3 shows that the engineering interface (ES), control process (RTS) and machine drive process (P1) are parallel processes, not processes that time share a switched control processor.

The rejection of claims 3-4, under 35 U.S.C. §103(a) as obvious over Armhein et al. in view of Steinmetz et al., is hereby respectfully traversed. Armhein et al. are inapposite to applicants' claimed invention for the reasons given above with reference to claim 1 as filed. Furthermore, Steinmetz discloses data-independent test selection logic for a diagnostic shell program and does not address the time base or the coordination of this SPC-type function with the MC that moves the tested objects. Thus Steinmetz is inapposite.

The rejection of claim 8 under 35 U.S.C. §103(a) as obvious per se, in view of Armhein, is hereby respectfully traversed. Armhein et al. are inapposite to applicants' claimed invention for the reasons given above with reference to claim 1 as filed.

The rejection of claim 15, under 35 U.S.C. §103(a) as obvious over Armhein in view of Palm et al., is hereby respectfully traversed. Armhein et al. are inapposite to applicants' claimed invention for the reasons given above with reference to claim 1 as filed. Furthermore, at col. 1, lines 32-37 Armhein et al. state that prior art control systems that interconnected SPC and MC modules adequately supported classic machine tool operations, but not the operation of production machines. Therefore, Armhein et al. teaches away from combining Palm et al. with control systems that do not use the stratified, synchronous control processor disclosed by Armhein et al.

It should be noted that European patent application EP 1 067 448 A2 that is discussed in paragraph **[0007]** of the present application, claims priority from the German application DE 19 93 19 33.2 that is distinguished by Armhein et al. from their stratified, synchronous control system. It is our understanding that German application DE 19 93 19 33.2 was withdrawn before publication. However, paragraph **[0007]** of the present application notes that EP 1 067 448 A2 discloses a control system that uses a communications processor clock to provide a stronger time base for that control system.

Independent claims 1 and 13 have been amended to recite the subject matter of claim 2, to further distinguish applicants' claimed invention from the control system disclosed by EP 1 067 448 A2. Applicants' control system is particularly advantageous in that the application of the communications processor's realtime clock to task switching permits the communications processor to relieve the control processor of acyclic, heavily computational tasks, such as the conversion of parametric and diagnostic data.

Independent claims 1 and 13 have been amended to recite "said cyclical communications clock being adapted to produce a communications clock signal," so as to provide explicit antecedent basis for the communications clock signal of the communications clock. Claims 1, 10 and 13 have also been amended to explicitly recite that it is clock signals that are used to provide derivative clock signals, rather than the clocks themselves, for the sake of clarity. In claim 15, "device" has been deleted as superfluous.

In view of the above, each of the presently pending claims in this application is believed to be in immediate conditions for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Reconsideration and allowance of the present application are respectfully requested.

Should the Examiner consider necessary or desirable any formal changes anywhere in the specification, claims and/or drawing, then it is respectfully requested that such changes be made by Examiner's Amendment, if the Examiner feels this would facilitate passage of the case to issuance. If the Examiner feels that it might be helpful in advancing this case by calling the undersigned, applicant would greatly appreciate such a telephone interview.

Respectfully submitted,

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